CLAIMS

What is claimed is:

1. A method for monitoring tire pressure in a vehicle having at least four wheels and wheel sensors, said method comprising the steps of sensing at least one attribute associated with wheel rotation of each of said at least four wheels, determining travel distances covered by each of said at least four wheels by evaluating said at least one attribute for each of said at least four wheels.

2. The method according to claim 1, wherein said at least one attribute associated with rotation of said at least four wheels is rotational speed.

3. The method according to claim 1, further comprising the step of summing said travel distances covered by each of said at least four wheels along diagonal groupings of said at least four wheels relative to the arrangement of said at least four wheels on said vehicle.

4. The method according to claim 3, further comprising the step of comparing the sums of said travel distances for each diagonal grouping of said at least four wheels, and recognizing an insufficient tire pressure condition when said sums differ from one another by more than a preselected limit value.

5. The method according to claim 3, wherein the step of determining said travel distances covered by each of said at least four wheels is carried out in a plurality of monitoring cycles, and further comprising the step of recognizing an insufficient tire pressure condition when deviations of the sums of said travel distances for diagonal groupings of said at least four wheels exceed a preselected limit value for said monitoring cycles.

6. The method according to claim 1, wherein said attributes which depend on wheel rotation are pulsed signals and said signals are counted in said step of determining said travel distances covered by each of said at least four wheels.

7. The method according to claim 6, wherein half waves of said pulsed signals are counted in said step of determining said travel distances covered by each of said at least four wheels.

8. The method according to claim 3, further comprising the steps of ascertaining whether the sums of said travel distances for each diagonal grouping of said at least four wheels have one of positive and negative and zero values, and determining the location of a wheel exhibiting an insufficient tire pressure based on whether said sums are one of positive and negative and zero.

9. The method according to claim 2, further comprising the step of summing said rotational speed of each of said at least four wheels along diagonal groupings of said at least four wheels relative to the arrangement of said at least four wheels on said vehicle.

10. The method according to claim 9, further comprising the step of comparing the sums of said rotational speeds for each diagonal grouping of said at least four wheels, and recognizing an insufficient tire pressure condition when said sums differ from one another by more than a preselected limit value.

11. The method according to claim 9, wherein the step of determining said rotational speed of each of said at least four wheels is carried out in a plurality of monitoring cycles, and further comprising the step of recognizing an insufficient tire pressure condition

when deviations of the sums of said rotational speeds for diagonal groupings of said at least four wheels exceed a preselected limit value for said monitoring cycles.

12. The method according to claim 9, further comprising the steps of ascertaining whether the sums of said rotational speeds for each diagonal grouping of said at least four wheels have one of positive and negative and zero values, and determining the location of a wheel exhibiting an insufficient tire pressure based on whether said sums are positive and negative and zero.

13. A tire pressure monitoring system for a vehicle having a plurality of wheels, a plurality of axles for supporting said wheels, and an anti-lock braking system including a control unit, said monitoring system comprising wheel sensors on at least one of said wheels of at least one of said axles for sensing attributes associated with wheel rotation, said control unit adapted to logically combine said attributes and to evaluate said attributes with respect to change of rolling radii of said wheels and to account for change of said attributes caused by driving operation, and means for generating a warning signal when said change of said attributes caused by tire pressure decrease exceeds a preselected limit value.

14. The tire pressure monitoring system according to claim 13, further comprising a tire pressure measuring system for measuring the tire inflation pressure of at least one of said wheels of at least one of said axles.

15. The tire pressure monitoring system according to claim 13, wherein said attributes associated with wheel rotation are at least one of the travel distances covered by said wheels and the rotational speed of said wheels.

16. The tire pressure monitoring system according to claim 14, wherein said tire pressure measuring system includes at least one wheel electronics package having a pressure sensor and an HF transmitter for transmitting said measured tire inflation pressure, a receiver/evaluation device for receiving said measured tire inflation pressure and comparing said tire inflation pressure with said preselected setpoint pressure, and means for generating a warning signal when the difference between said tire inflation pressure and setpoint pressure exceeds a preselected threshold value.

17. The tire pressure monitoring system according to claim 16 wherein said at least one wheel electronics package is disposed on at least one of said wheels.

18. The tire pressure monitoring system according to claim 16, wherein said at least one wheel electronics package is disposed on said vehicle.

19. The tire pressure monitoring system according to claim 16, wherein said wheel sensors and said at least one wheel electronics package are provided for each of said wheels of all of said axles.

20. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said first, second and third axles, and said wheel sensors are provided on said wheels of said first and second axles.

21. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said second and third axles, and said wheel sensors are provided on said wheels of said first and second axles.

22. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said first and third axles, and said wheel sensors are provided on said wheels of said first and second axles.

23. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said third axle, and said wheel sensors are provided on said wheels of said first and second axles.

24. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said first axle, and said wheel sensors are provided on said wheels of said first, second and third axles.

25. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said first and second axles, and said wheel sensors are provided on said wheels of said first, second and third axles.

26. The tire pressure monitoring system according to claim 16, wherein said vehicle has first, second and third axles, and said at least one wheel electronics package is provided for said wheels of said first and third axles, and said wheel sensors are provided on said wheels of said first, second and third axles.

27. The tire pressure monitoring system according to claim 16, wherein said receiver/evaluation device is integrated into said control unit.

28. The tire pressure monitoring system according to claim 16, further comprising a controller area network interface for controlling the transmission and reception of signals representing said measured tire inflation pressure.

29. The tire pressure monitoring system according to claim 16, further comprising a microcontroller for receiving signals representing said measured tire inflation pressure from said at least one wheel electronics package.

30. The tire pressure monitoring system according to claim 16, wherein said vehicle has second and third axles, dual sets of tires on each of said second and third axles, and said at least one wheel electronics package is provided for all of said dual sets of tires.

31. The tire pressure monitoring system according to claim 16, wherein said at least one wheel electronics package includes an identifier which is transmitted during transmission of said measured tire inflation pressure.

32. The tire pressure monitoring system according to claim 15, further comprising at least one microcontroller for receiving signals from said wheel sensors and counting periods of said signals to determine said travel distances covered by said wheels.

33. A method for monitoring tire pressure in a vehicle having a plurality of wheels, a plurality of axles for supporting said wheels, and an anti-lock braking system including a control unit and wheel sensors, said method comprising the steps of sensing a value associated with wheel rotation for each of said wheels, summing said value along diagonal groupings of said wheels relative to the arrangement of said wheels on said vehicle, comparing the sums of said values for each diagonal grouping of said wheels, recognizing an insufficient tire pressure

condition and generating a warning signal when said sums differ from one another by more than a preselected limit value.

34. The method according to claim 33, further comprising the step of ascertaining whether the sums of said values associated with wheel rotation for each diagonal grouping of said wheels have one of positive and negative and zero values, and determining the location of a wheel exhibiting an insufficient tire pressure based on whether said sums yield one of positive and negative and zero values.

35. The method according to claim 33, wherein the step of sensing said value associated with wheel rotation is carried out in a plurality of monitoring cycles, and further comprising the step of recognizing an insufficient tire pressure condition when deviations of the sums of said values associated with wheel rotation for diagonal groupings of said wheels exceed a preselected limit for said monitoring cycles.

36. The method according to claim 33, further comprising the steps of measuring the tire inflation pressure of at least one of said wheels of at least one of said axles utilizing a tire pressure measuring apparatus, comparing said tire inflation pressure with a preselected setpoint pressure, and generating a warning signal when the difference between said tire inflation pressure and setpoint pressure exceeds a preselected threshold value.

37. The method according to claim 33, wherein said value associated with wheel rotation is wheel travel distance.

38. The method according to claim 33, wherein said value associated with wheel rotation is rotational speed.